

## Reference Electrode



**KRE04**

### **Hg/HgO/OH<sup>-</sup> Reference Electrode**

This Hg/HgO/OH<sup>-</sup> reference electrode is ideal for use in alkaline or fluoride media. The electrode is supplied with electrolyte filling. The standard ground-joint 14/23

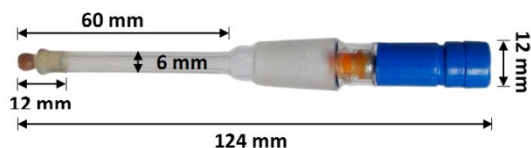
enables easy assembly with all KLyte electrochemical cell tops.

## Technical Specification

<b>Reference system</b>	Hg/HgO/OH <sup>-</sup>
<b>Purpose</b>	For alkaline or fluoride medium (aqueous)
<b>Chemical reaction</b>	$\text{HgO}_{(s)} + 2\text{e}^- + \text{H}_2\text{O} \rightleftharpoons \text{Hg}_{(l)} + 2\text{OH}^-$
<b>E°</b>	+140mV (at 25°C vs. NHE)
<b>Typical variance</b>	±5mV
<b>Refilling electrolyte</b>	1M NaOH solution
<b>Inner Diaphragm</b>	Glass-frit (G4)
<b>Outer Diaphragm</b>	Silica-based porous frit
<b>Electrode Plug-in-head</b>	Compatible with KLyte banana connector cable (4mm)
<b>Standard Ground Joint</b>	14/23
<b>Temperature range (°C)</b>	5-100 (Approx.)
<b>Shaft material</b>	Borosilicate Glass
<b>Shaft diameter (Top)*</b>	12mm
<b>Shaft diameter (Bottom)*</b>	6mm
<b>Length*</b>	124mm
<b>Immersion length*</b>	>12mm; <60mm

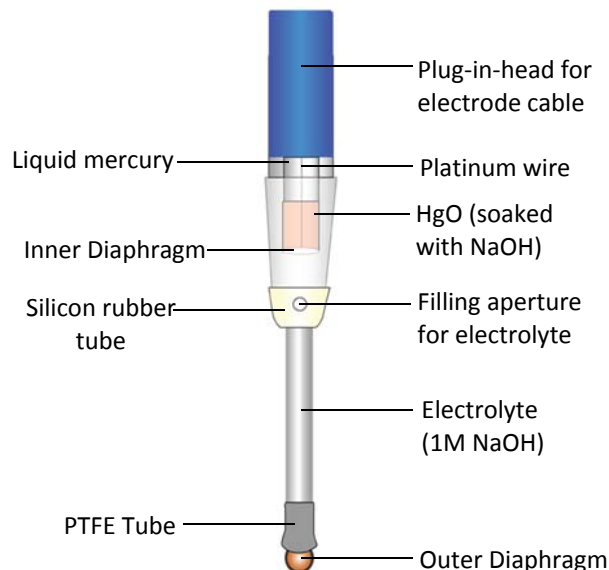
\*Please refer to the image of electrode dimensions

## Electrode dimensions



## Maintenance and Handling

The reference electrodes are highly sophisticated, as well as delicate accessories. A small perturbation in an external parameter can change the performance of the electrode. Therefore, it must be handled carefully. Proper maintenance will ensure good reproducibility and longer life-time of the reference electrode.



### **Dual compartment reference electrode with Hg/HgO/OH<sup>-</sup> reference system**

- **Conditioning:** The electrodes are shipped with electrolyte filling. Before using the electrode, first, the user needs to make sure to remove the silicon-rubber black cap at the end of the electrode tubing and rinse the electrode body with double-distilled water. The

black cap should be removed as gently as possible so that the bottom frit does not come out and damage the electrode. The reference electrode then must be conditioned by dipping in NaOH solution (same as the filling solution) for two days at room temperature.

- **Storing the electrode:** Proper storage of the reference electrodes is required to prevent damage when not in use. The silica-based porous frit at the bottom of the electrode should always remain wet since it allows ionic transport. Otherwise, the solution inside the pores will dry out, causing high resistance, an increase in noise, or even the potential out of control. In this case, the electrode may be recovered by refilling it with only deionized water and keeping immersed in deionized water overnight. Afterwards, refilling it with 1M NaOH filling solution and keeping it dipped also in the NaOH solution overnight.

- **Electrolyte refilling procedure:** Reference electrodes must be filled with the proper filling solution to function correctly. To refill the electrode with 1M NaOH solution, carefully remove the silicon rubber tube from the filling aperture by holding the glass tube in one hand and pushing the silicon rubber tube downwards with the other hand. Using a syringe to refill is recommended. The solution level should be full, and there should not be any air bubble trapped inside. The refilling solution should be inserted slowly to avoid generating much pressure. Pressure may cause the diaphragms (porous silica-based tip) to be popped out or damaged.

- **Using in high-temperature measurement:** The operating temperature range of the KLyte Hg/HgO/OH<sup>-</sup> reference electrode is approximately 5°C to 100°C. It should be noted that the electrode potential is a temperature-dependent quantity. Hence, it is advisable to conduct high-temperature analysis by isolating the reference electrode with a salt-bridge and keeping the reference electrode at room temperature.

- **Precautions:** This electrode contains liquid mercury, and its compound, which are known to be a health hazard and harmful to the environment. Hence this electrode should be handled carefully.

The electrode should always be kept upright within the storage bottle when not in use.

NaOH is corrosive, so while refilling, the electrode should be handled carefully and its external body should be washed with double distilled water to get rid of any spilled NaOH solution.

This electrode is used in an alkaline solution. It should not be used in an acid medium or in a solution containing cations that may form an insoluble precipitate. It cannot be used in an organic electrolyte.

The impedance of the reference electrode should be low (less than 10kΩ). The common cause for high impedance is the blockage of the junction frits. Adsorption of organic materials or precipitation of insoluble salts in the junction can both cause clogging and hence results in high impedance (more than 1MΩ). It is advisable to use salt-bridge to prevent the electrode frits from clogging.

### Included Parts:



Storage vial for reference electrodes.

### Optional Parts:



**KEC10A**  
Banana Cable Set



**KEC10B**  
Banana Connector Pin



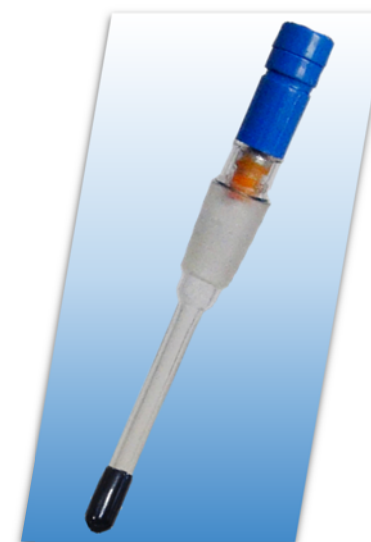
**KA01 (Red), KA02 (Black)**  
Alligator Clip



## Kanopy Techno Solutions

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### Product Information Leaflet



***Hg/HgO/OH<sup>-</sup>*** Reference Electrode  
Product ID: KRE04

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